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Original Article

Effect of lavender aromatherapy on menopause hot flushing: A crossover randomized clinical trial

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Abstract

Background: Flushing is generally considered to be the primary symptom of menopause and is typically the most common complaint in menopausal women. Although flushing poses no danger to a woman's health, it decreases the quality of life. Thus, the purpose of this study was to determine the effect of lavender aromatherapy on menopause flushing.

Methods: This double-blinded crossover clinical trial included 100 menopausal women 45–55 years of age who were referred to various health centers in Ardabil, Iran in 2013–2014. Samples were blocked randomly and divided into two intervention (lavender) and control (diluted milk) groups. Lavender aroma was smelled for 20 minutes twice a day, over a 12-week period. Data were collected using a demographic questionnaire, and flushing numbers were duly recorded. Data analysis was performed by SPSS version 16 (SPSS Inc., Chicago, IL, USA) using the Chi-square and *t* test.

Results: The results of our investigation showed that both groups had no significant difference according to demographic characteristics ($p > 0.05$). Additionally, the flushing number significantly decreased in the intervention group than in the control group ($p < 0.001$).

Conclusion: This study indicated that the use of lavender aromatherapy reduced menopause flushing. Given the impact of stress on flushing and the undesirable effects of menopause symptoms on the quality of life, it would appear that this simple, noninvasive, safe, and effective method can be used by menopausal women with noticeable benefits.

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Keywords: hot flashes; *Lavandula*; menopause

1. Introduction

Hot flushing is the most common complaint of women undergoing menopause,¹ such that ~50–80% of menopausal women worldwide experience this uncomfortable symptom.² The highest prevalence of flushing is found in Western countries, whereas the lowest is in China and Asian countries; therefore, hot flushing may be influenced by ethnicity and

culture.³ Additionally, the prevalence of flushing in menopausal women was reported to be 49–56% in Iran.⁴

Vasomotor flushing is considered to be the main symptom and the most common problem of menopause. Flushing generally involves no inherent health danger, but it decreases the quality of life of people suffering from this uncomfortable symptom. In cross-sectional evaluations, about 40% and 85% of women had complained of vasomotor problems before and after menopause, respectively. Although flushing may start before menopause, hot flushing is the main feature of menopause and lasts ~1–2 years in most women; however, in 25% of females it lasts more than 5 years. Until recently, the pathophysiology of flushing has not been well understood. During a hot flush, hormone production is stopped in the

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ovaries, which decreases the level of estrogen in the blood circulation, and increases the activity and stimulation of serotonin receptors (5-HIAA) in the hypothalamus. Activation of these receptors promotes some changes in the temperature regulation center and stimulates autonomic reactions such as increasing body temperature and sweating, resulting in hot flushing.^{5,6} Flushing occurs simultaneously with a sudden secretion of luteinizing hormone (LH). The relationship between the sudden secretion of LH and rising temperature has not yet been defined. It seems that the same hypothalamus events creating hot flush are responsible for secreting gonadotropin hormone and also enhancing LH secretion. This problem is likely caused by hypothalamic changes of neurotransmitters that enhance autonomic and nerve activities.⁷ The primary treatment for flushing is hormone therapy, which can reduce it by 70–80%.⁸ However, due to particular side effects of hormone replacement therapy, including an elevated risk of breast cancer, thrombophlebitis, hypertension, vaginal bleeding, and gall bladder disease, fewer patients have undertaken hormone therapy and more have considered nonhormonal therapies.⁹ In the past decade, the use of nonhormonal cures such as nutrition, sport, aromatherapy, homeotherapy, relaxation, and herbal medicine has increased significantly for reducing menopause symptoms.¹⁰ It is believed that every factor causing the secretion of serotonin and endorphin, and reduction of neurepinephrin also decreases hot flushing.¹¹

Aromatherapy as a complementary and alternative medicine has long been utilized for improving women's health.¹² Lavender with the scientific name of *Lavandula* is one of the plants used for aromatherapy. Lavender oil contains linalool, linalyl acetate, lavender, geraniol tannin, flavonoids, and cineol, and has antimicrobial, antifungal, antibiotic, and antidepressant effects.¹³ Lavender has widely been used in the fields of psychosomatic obstetrics and gynecology, for relieving labor¹² and postcesarean pain, in the treatment of dysmenorrhea,¹⁴ for reducing postpartum depression and anxiety,¹⁵ and for minimizing symptoms such as arthralgia, hot flushes, melancholia, and myalgia.¹⁶ Researchers have suggested several characteristics of lavender, including antispasmodic, diuretic, and pain relieving properties.¹⁷ The most important components in lavender essence are linalylacetate and geranylacetate. In general, linalylacetate has been defined as a pain reliever.¹⁸ Other therapeutic effects of lavender have also been reported; for example, a blinded clinical trial intended to assess the effect of lavender in treating anxiety in people with dementia showed substantial improvement in the anxiety levels of those treated by aromatherapy.¹⁹ The effect of lavender on insomnia was also studied in the form of a crossover blinded randomized trial, where the prescription of lavender caused moderate improvement in patients' symptoms.²⁰ Issues related to menopause are a research priority in Iran, and prevention of undesired consequences is the responsibility of midwives. Flushing is one of the most common and painful problems of women during menopause. Among complementary medicines, lavender has the fewest side effects and is both accepted by and useful for women.²¹ As we could

not find any research studying the effect of lavender on flushing in Iranian women, this research aimed to determine the effect of lavender aromatherapy on menopausal flushing.

2. Methods

This crossover double-blinded clinical trial was conducted on those women referred to the various health centers affiliated with Ardabil University of Medical Science, Ardabil, Iran in 2013–2014. This study was first approved by the Ethics Committee, after which the list of all health centers was provided. Sampling started from the centers that had the most patients and expanded to the other centers until the desired sample size was obtained. The target population was women 45–55 years of age who were referred to the health centers. Based upon their provided health profiles, we invited those women who received family planning services, were of menopausal age, and had complained of flushing to participate in the study if they were interested. Participants were selected through the use of a nonrandom sampling method. Therefore, women who met the inclusion criteria (lack of menstruation in the past 12 months, having normal blood pressure, not taking estrogen or progesterone hormones in the past 6 months, lack of asthma and other allergies, married, and literate) were selected, and a gynecologist took complete medical histories of the participants and assessed them. The data collection tool consisted of a demographic questionnaire and a flushing record sheet. After obtaining written informed consent, the participants were placed in two groups, lavender ($n = 50$) and placebo ($n = 50$ persons), by random blocking of four and six persons, with an allocation ratio of 1:1. Sequence allocation was defined using a computerized random number table. To complete blinding of allocation, numbered bottles in the same shape and size were used which contained lavender essence or diluted milk. At first, a demographic questionnaire was completed through face-to-face interviews for both groups; after necessary explanation, the participants were asked to record their flushing numbers daily for a week and report the results to a research assistant. Then, patients were administered lavender or placebo aromatherapy twice a week for 20 minutes for a 12-week period for each group. Subsequently, members of each group were again asked to write their flushing numbers daily for 1 week, and provide the results to a research assistant. After a 4-week washout period, the first and second groups were given placebo and lavender, respectively, to be used according to specific prescriptions, and flushing record sheets were filled up again. Neither the research assistant nor the studied patients were informed about the transposition of the main aroma and placebo (blinding).

2.1. Analysis of data

The sample size to compare group means was estimated to be 45 (using the means' comparison formula and considering a 10% attrition rate, it became 50) in each group according to Shahnazi et al²² and by 90% power and $\alpha = 0.05$. Data analysis was performed using SPSS version 16 (SPSS Inc.,

Chicago, IL, USA) through independent *t* test and Chi-square test, and $p < 0.05$ was considered significant.

3. Results

The current research was conducted on 100 menopausal women (50 in each group) who suffered from flushing symptoms. Both groups had no significant differences before treatment, according to demographic characteristics. The age mean in the first group was 52.24 years and in the second group was 51.5 years. The majority of the participants had low literacy levels and were housewives (Table 1).

There was no significant difference between the two groups before intervention, with respect to the resulting flushing numbers. However, flushing numbers in the intervention group had significantly decreased compared with those of the control group after intervention (Table 2).

Although there was no significant difference between the two groups before intervention, the flushing number decreased significantly in the intervention group compared with that in the control group after using lavender (Table 3).

4. Discussion

The current research results suggested that lavender aromatherapy reduced flushing numbers during menopause. This reduction may be related to a decline of stress hormone and stimulation of beta-endorphin secretion.²³ Scientifically, one proposed theory suggests that aromatherapy can be both psychologically and physiologically effective. It is believed that odors are caused by aromas activating olfactory nerve cells, resulting in limbic system stimulation. Depending on the type of aroma, nerve cells release different neurotransmitters including enkefalin, noradrenalin, and serotonin.

Table 1
Comparison of the demographic characteristics of the participants in intervention and control groups.

Variable	Intervention group <i>N</i> = 50	Control group <i>N</i> = 50	<i>p</i>
Age (y)	51.5	52.24	0.74
No. of delivery			0.17
< 4	21	24	
> 4	29	26	
Education			0.21
Primary	28	31	
Junior high school	11	10	
High school	9	5	
University	7	4	
History of menopause			0.53
< 2 y	19	17	
> 2 y	31	33	
Job			0.67
Employee	37	39	
Housewife	5	3	
Retired	8	8	
Income adequacy			0.21
Yes	12	16	
No	30	25	
Somehow adequate	8	9	

Table 2
Comparison of flushing numbers in control and experimental groups.

Variable	Experimental group, mean (SD)	Control group, mean (SD)	<i>p</i>
Flushing mean before intervention	21.72 (12.00)	20.72 (9.94)	0.651
Flushing mean after intervention	10.58 (7.34)	19.70 (13.40)	<0.001

SD = standard deviation.

Alternatively, considering the relationship between the olfactory sense and the human soul and feelings, aromas can have an effect on people's soul and body. Actually, it would appear that odors are able to change feelings in people.²⁴ Herz²⁴ demonstrated that lavender acts postsynaptically and believed that lavender modulates cyclic adenosinemonophosphate activity. A decrease in cyclic adenosinemonophosphate activity is related to sedation.

The results presented in this current study are consistent with those of several previous studies. The study by Hur et al¹⁶ revealed that aromatherapy massage using lavender, rose geranium, rose, and jasmine in almond and primrose oils once a week for 8 weeks was effective in alleviating the symptoms of menopause including hot flushes, pain, and depression. Kazemian et al²⁵ in their study suggested that valerian extract had a positive effect on the number and intensity of flushing events. Tice et al's²⁶ study, which aimed to determine the effects of two products of red clover on flushing, reported that phytoestrogen in clover extract is not effective in decreasing flushing. Heyerick et al²⁷ also reported the effect of hop extract on the intensity and number of flushing, similar to the current study. In addition, Nahidi et al²⁸ reported the effect of phytoestrogen on the number of flushing events. Abbaspour et al²⁹ also reported that soya protein can affect the number and intensity of daily flushing. Van Patten et al³⁰ stated that they do not know why phytoestrogen in soya was effective in decreasing daily flushing in menopausal women with breast cancer, and that the probable cause was that stress is an intensifying factor for flushing during the menopause period; however, it appeared that lavender causes a reduction in flushing by decreasing stress and anxiety in menopausal women. In the research of Enjezab et al,³¹ a daily use of 60 g soya decreased the number of flushing events in menopausal women in the 1st month, and this reduction continued for the 2nd month and 3rd month after intervention. While in Lewis et al's³² research that continued for 16 weeks, the use of soya wheat and cotton seed was not effective in reducing the number of flushing episodes. Abbaspour et al²⁹ also found soya to be effective in decreasing the intensity and number of

Table 3
Comparison of flushing numbers between the two groups before and after intervention.

Variable	Difference means	Standard deviation	df	<i>t</i>	<i>p</i>
Flushing No. before intervention	−1.01	2.20	98	−0.545	0.651
Flushing No. after intervention	9.12	2.16	98	4.220	<0.001

df = degree of freedom.

daily flushing in menopausal women. In a study by Taavoni et al.³³ on 87 women, aromatherapy massage was performed by incorporating lavender, geranium, rose, and rosemary, twice a week and for 4 weeks, which affected the psychological symptoms of menopause.

Symptoms of menopause may have negative effects on women's lives; therefore, proper management of these symptoms is essential. Owing to the willingness of menopausal and middle-aged women to use herbal supplements, and the existence of minimal research in the field focusing on women of the mentioned age group, there is a need for further investigation to determine the effectiveness of these supplements.

In conclusion, in the present research, the effect of lavender aromatherapy on menopause flushing was apparent. Regarding the effect of stress on rising menopause flushing, it can be suggested that women suffering from flushing should smell lavender essence, which is a simple, noninvasive, safe, and effective method of therapy. This may represent an improvement in solving family, social, psychological, and emotional problems caused by hot flushing during menopause.

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